WOMEN'S PARTICIPATION IN SEATTLE'S HIGH-TECH ECONOMY

MADELYN SHIELDS
MAY 1, 2015
GEORGIA INSTITUTE OF TECHNOLOGY
SCHOOL OF CITY AND REGIONAL PLANNING
FACULTY ADVISOR: ANNA J. KIM, PHD

CONTENTS

Introduction....1
Rationale for Analysis....1
Beyond the Pipeline: Company Culture & Industry Issues....3
Methods....7
Definitions....7
Themes....8
Hypothesis....9
Data Limitations....9
Background....11
Site Description....11
Startup & Small Business Potential....13
Literature Review....14
Analysis....17
Conclusion....23
Appendix....26
References....0

INTRODUCTION

The rise of software development jobs has created a growing source of high-income occupations. Cities and regions with IT clusters need to capitalize on this growth opportunity by making the growth more inclusive to provide benefits for society as a whole. In Seattle, a high-tech economic development strategy has led to an increase in quality jobs and economic innovation. Post-recession job growth has been driven by IT industries that provide high wages, but this growth is accompanied by gender inequality with a growing wage gap between men and women.

As an established tech hub, Seattle is home to Amazon and Microsoft, companies with white-male-dominated firm culture. This culture and the associated hiring practices have contributed to a lack of diversity in the industry workforce. An equitable and sustainable high-tech economic development strategy would promote a workforce that is representative of the diverse population, allowing women and minorities access to quality job growth in the high tech industry. Beyond the tech giants, small business drives a significant portion of the high-tech industry in Seattle and greatly contributes to the evolutionary innovation processes.

What are the local causes and consequences of continued gender disparities in the high-tech industry as well as the possibility for participation and inclusion in small businesses and startups? What are the overall trends in high-tech business establishments overtime and how is this related to the overall employment and separation rate for women in the area's high-tech industry? Do start-ups and/or small businesses function as a means of inclusion for the high-tech industry in Seattle? How do female ownership and employment compare in Seattle's high-tech industry? And how do these trends correlate with social sentiment in news articles and blogs?

Local causes of continued gender disparities may be attributed to traditional industry culture originating in the large high-tech employers. The consequences could include an increased gender wage disparity and increased ratio of men to women employed in high-tech. Start up and small business distribution could be more favorable to women owners and employees. Small businesses have the potential to function as a means of inclusion.

Startups and small businesses, especially with women owners and/or executives could provide opportunity for high-tech jobs outside of the typical industry culture. The educational pipeline is not the only issue; retaining women in the high-tech labor force is integral to sustainable and equitable growth in high-tech as women become discontent with large tech corporate culture. Startups function as part of the industry cycle, with large company employees exiting to start their own business and startups being acquired by large companies. If a city wants to invest in an equitable economic development strategy in high-tech, providing services that bolster a gender diverse entrepreneurial ecosystem is a way they can effect private industry and its impact on the region.

RATIONALE FOR ANALYSIS

Women's participation in high-tech fields has implications for individual companies, for the future of the industry, and for the city. The consequences of continuing "business as usual" growth will come at an enormous cost to these groups.

Bill Destler, President of Rochester Institute of Technology wrote, "Diversity isn't

an altruistic aspiration; it's a competitive demand," that allows a company to attract and retain top talent[1]. Companies invest in recruiting and training employees, and retention is key to seeing high returns. In addition to this, several studies show that mixed gender teams are more productive and creative[2]. Studies have also shown that companies with women as executives are more successful; a study by McKinsey showed that the average return on gender equity in executive committees was a 47 percent in overall financial performance[3]. A National Center for Women in Information Technology report[4] cites multiple studies showing that teams with both men and women produce IT patents cited 26 to 42 percent more than the norm[5], teams with equal numbers of men and women were more likely to "experiment, be creative, share knowledge, and fulfill tasks[6]," and teams made up of diverse members consistently achieve more than teams with "highest-ability" members[7]. Gender diversity makes organizations better workplaces with the potential for higher profits. This makes a persuasive business case for tackling significant obstacles that women in tech companies face in the workplace: lack of opportunity for recognition and career progression, challenges of work-life balance, and the "isolation and unconscious biases" women often experience in a male-dominated workplace[8].

For the high-tech industry, attracting and retaining women is crucial to continued growth, because of a projected shortage of talent. Attrition rate is not only important to individual companies, but the industry's future as whole: the US Department of Labor predicts 218,400 more computer software engineer jobs by 2018 and if current trends continue, they will only be capable of filling half of the available jobs[9]. While industry is pushing for to allow more H1-B visas, they are neglecting to leverage native talent. A report out of the Anita Borg Institute refers to a study that found 56 percent of women in the sector left over time with quit rates more than double the rate for men[10]. Most women with computer science degrees stay in the workforce, but find positions in other fields[11]. The shortage of talent in tech could be at least partially remedied by creating an environment that is inclusive and welcoming for women. Considering the lower rate of women attaining degrees in computer science, the IT industry has a major incentive to keep current employees and adapt their culture to be more attractive to potential workers.

For cities, increasing women's participation in high-tech allows for investment in a broader range of people. In Seattle, where the fastest growing occupations and largest companies have trouble retaining women, it becomes a question of equity. In an article for

[1] Huffington Post, 2013
[2] Woolley, et al., Science, 2010; Page, Princeton University Press, 2007; Lehman Brother Centre for Women in Business, London Business School, 2007; Ashcraft and Breitzman, NCWIT, 2012 cited in Anita Borg Institute Report (2013), 1
[3] Women Matter, Gender Diversity at the top of corporations: Making it happen, McKinsey, 2010
[4] Ashcroft, C., & Blithe, S. (2010). Women in IT: The facts. National Center for Women and Information Technology.
[5] Ashcroft and Breitzman, Who Invents IT?, 2012
[6] Lehman Brother Centre for Women in Business, Innovative Potential: Men and women in teams, 2007
[7] Page, S. The difference, 2007
[8] Anita Borg Institute. (2013). Recommendations and Best Practices to Retain Women in Computing. Women Technologists Count.
[9] Ashcroft, C., & Blithe, S. (2010). Women in IT: The facts. National Center for Women and Information Technology.
[10] Hewlett, Luce, & Servon, Harvard Business Review, 2007
[11] Fouad & Singh, U of Wisconsin-Milwaukee, 2012 cited in Anita Borg Institute Report (2013), 2

Seattle's tech news site, local tech entrepreneur Tarah Wheeler Van Vlack describes the issue:

> *"Large Seattle companies are hiring tens of thousands of tech workers with no thought to gender diversity. Seattle is shifting to a place where men have the well-paid jobs, and women work in support positions. Even when women set out to create a tech career for themselves, they're faced with profound barriers and bias at every point in their struggle. Women leak from every joint in the tech career pipeline[12]."*

The underrepresentation of women in IT occupations is most often studied through the lens of gender disparities in the STEM educational pipeline[13], despite research verifying hidden biases within the workplaces that generate unequal outcomes[14]. While disparities in the STEM pipeline must be addressed, the multifaceted problem of underrepresentation within the IT sector will not be resolved without also investigating how industry practices and culture effect the recruitment, hiring, workplace experiences of women[15].

BEYOND THE PIPELINE: COMPANY CULTURE & INDUSTRY ISSUES

Diversity at large tech companies has been a public issue for some time, but the conversation about women in tech gained public attention with Facebook CEO Sheryl Sandberg wrote "Lean In," a book that details her own workplace experiences and gives women advice on how to succeed in a systematically gender bias environment. (This increased interest can be seen via Google search trends, which show an extreme spike in "women in tech" searches the month Sandberg's book was released). Increased interest in high-tech hiring put pressure on industry giants who then released diversity reports in 2014. The reports confirmed anecdotal evidence that these companies employ a largely male and white workforce, especially in tech and leadership positions[16]. Because these companies, especially Seattle's Amazon are experiencing booming growth[17], their hiring practices and company culture impact entire cities[18].

Men dominate IT occupations and sectors nationally: for example, women represent only 19.8 percent of Software Developers, an occupation with a median salary

[12] Wheeler Van Vlack, T. (2015, January 15). Commentary: To bring 'binders full of women' into tech, we must get on the same page.

[13] Huhman, H. (2012, June 20). STEM Fields And The Gender Gap: Where Are The Women?; Clark Blickenstaff, J. (2006). Women And Science Careers: Leaky Pipeline Or Gender Filter? Gender and Education, 369-386; Maltese, A., & Tai, R. (2011). Pipeline Persistence: Examining The Association Of Educational Experiences With Earned Degrees In STEM Among U.S. Students. Science Education, 877-907.

[14] Fouad, N. (2014, August 7). Leaning in, but Getting Pushed Back (and Out). American Psychological Association 2014 Annual Convention. Lecture conducted from Washington DC; Corbyn, Z. (2015, March 8). Silicon Valley is cool and powerful. But where are the women? The Guardian; Beninger, A. (2014). High Potentials in Tech-Intensive Industries: The Gender Divide in Business Roles.

[15] Level Playing Field Institute. (2011). The Tilted Playing Field: Hidden Bias in Information

[16] Inside Microsoft. (2014). Microsoft Webpage; Diversity at Amazon. (2014). Amazon.com; Our Workforce Demographics. (2014). Google Webpage

[17] Cook, J. (2014, October 23). Holy, crap: Amazon added 40,000 employees in the past year, nearing 150,000 staffers worldwide. from GeekWire

[18] Bishop, T. (2014, November 26). Company town: Amazon's rapid growth sparks housing boom in Seattle's urban core. From Geekwire; Reifman, J. (2014, November 19). 'Amageddon': How Amazon's culture is taking a toll on Seattle's future. from Geekwire

of $92,820 per year[19]. Women earn only 78 cents for every dollar earned by men in the Software Developer occupation nationally[20].

Tech company culture is known for promoting white male nerd entitlement. The phenomenon aptly labeled as "Brogrammer Culture" entered that national lexicon around 2012 when a series of articles including "'Gangbang Interviews' and 'Bikini Shots': Silicon Valley's Brogrammer Problem" by Tasneem Raja for Mother Jones. Raja's article describes sexism at industry conferences and in recruiting techniques, with harsh social consequences for speaking against it[21].

FIGURE 1: FROM 'GANGBANG INTERVIEWS' ILLUSTRATION BY C. KUHWALD

Brogrammer culture and white male nerd entitlement thrive at tech companies where organizational conditions were developed and are controlled by some of the most advantaged people in the country, who are convinced that they are among the least. Figure 1 depicts 'brogrammer' culture as described by Raja.

This culture was born out of the dominating new forces of engineering and tech companies in the 1990s, described in ethnography by Gideon Kunda as "insidious" and "dangerous"[22]. The organizational structure used in these companies differs from traditional workplaces and promotes new ideals of individualism and democracy. Kunda's study reveals this new construct to be a form of normative control, where a strong company culture replaces the structures of the past. This creates an environment where ideal employees have internalized the organization's interests so there is no need for rigid regulation. Kunda claims that the lines between personal and corporate life are purposely blurred as a subversive tactic to "control underlying experiences, thoughts, and feelings." Those who dissent from the highly prescriptive set of behaviors (designed and disseminated by men) are often marginalized or 'burn-out.'

While the pipeline is important evidence suggests that marginalization of women in the workplace and an exclusionary tech culture also have an impact on participation and diversity. The National Girls Collaborative Project reports that girls are taking high-level math and science courses at a similar rate to boys in K-12 education[23]. The magazine Wired ran an article titled "In a First, Women Outnumber Men in Berkeley Computer Science Course" in 2014[24]. Despite these educational improvements, women are employed in STEM at about half the rate of men with the same credentials[25]. In her article "Why are Women Leaving the Tech

[19] Bureau of Labor Statistics, Annual Averages by Occupation 2014

[20] Current Population Survey, Household Data Annual Averages and Median Weekly Earnings, BLS 2013

[21] Raja, T. (2012, April 26). "Gangbang Interviews" and "Bikini Shots": Silicon Valley's Brogrammer Problem. from Mother Jones

[22] Kunda, G. (2009). Engineering culture: Culture and control in a high-tech organization (2nd ed.). Massachusetts Institute of Technology.

[23] NSF, Science & Engineering Indicators, 2012).

[24] Finley, K. (2014). In a First, Women Outnumber Men in Berkeley Computer Science Course | WIRED.

[25] Christian Landivar, L. (2013). Disparities in STEM Employment by Sex, Race, and Hispanic Origin. From American Community Survey Reports, US Census

Industry in Droves," Tracey Lien emphasizes the importance of industry issues saying that,

> *"Women in tech say filling the pipeline of talent won't do much good if women keep quitting- it's like trying to fill a leaking bucket[26]."*

IT firms frequently represent themselves as meritocracies, but studies show workplace experiences differ considerably[27] Gender privilege and power in the tech workplace has been established in multiple studies[28]. When companies blame the educational pipeline they are diminishing their own role in the issue. Tech culture is saturated with the dangerous and erroneous belief that their hiring practices function as a meritocracy[29]. In "The Paradox of Meritocracy in Organizations" authors Castilla and Benard test the argument that "when an organizational culture promoted meritocracy (compared to when it does not), managers in that organization may ironically show greater bias in favor of men over equally performing women[30]." A recent lab study yielded results showing two of three managers chose male job contenders, even when they did not perform as highly as women on math problems during the application process[31].

Besides hiring practices, one of the major issues in the industry is retaining women already employed in technology[32]. A research report in the Harvard Business Review names this phenomenon a female brain drain in science, engineering and technology. The HBR report showed staggering female quit rates across STEM fields, the worst at 56 percent for women in technology, compared to 17 percent of men[33]. This rate is reflected in the percentage of women in computing jobs; today they make up 26 percent of the workforce compared to 37 percent in 1991[34]. The Harvard study cited a hostile male culture, feeling of isolation and a lack of a clear career path as issues for retaining women in tech. A 2014 study from the Catalyst Research Center reported that 73 percent of women in the industry felt like outsiders compared to 17 percent of men[35]. Companies stand to improve their bottom line as well as their public image if they take responsibility for the attrition rate of women in tech.

Further evidence of the hostile culture can be found in recent events surrounding tech

[26] Lien, T. (2015). Why are women leaving the tech industry in droves? From LA Times

[27] Level Playing Field Institute, 2011

[28] Gray, M., & James, A. (2007). Connecting gender and economic competitiveness: Lessons from Cambridge's high-tech regional economy. Environment and Planning, 39, 417-436; Kvasny, L., Trauth, E., & Morgan, A. (2009). Power relations in IT education and work: The intersectionality of gender, race, and class. Journal of Information, Communication and Ethics in Society, 96-118; Ben, E. (2007). Defining Expertise in Software Development While Doing Gender. Gender, Work & Organization, 312-332.

[29] Faulkner, W. (2009). Doing gender in engineering workplace cultures. I. Observations from the field. Engineering Studies, 3-18; Eikhof, D. (2012). A double-edged sword: Twenty-first century workplace trends and gender equality. Gender in Management: An International Journal, 7-22.

[30] Castilla, E., & Benard, S. (2010). The Paradox of Meritocracy in Organizations. Administrative Science Quarterly, 543-576.

[31] Reuben, E., Sapinenza, P., & Zingales, L. (2014). How stereotypes impair women's careers in science. Proceedings of National Academy of Sciences, 111(12).

[32] Ashcroft, C., & Blithe, S. (2010). Women in IT: The facts. National Center for Women and Information Technology.

[33] Hewlett, Servon, Sherbin, Shiller, Sosnovich, and Sumberg. "The Athena Factor: Reversing the Brain Drain in Science, Engineering, and Technology." HBR Research Report (2008).

[34] Williams, Joan. "Hacking Tech's Diversity Problem." Harvard Business Review. 1 Oct. 2014. Web. 13 Mar. 2015.

[35] Beninger, A. (2014). High Potentials in Tech-Intensive Industries: The Gender Divide in Business Roles.

conferences and subcultures of the tech industry. Public harassment of women in tech has become commonplace[36]. Anita Sarkeesian, media critic, promoted a Kickstarter campaign to create programs that combat harmful gender stereotypes in videogames. Soon after publicizing this campaign in 2012, she received countless sexist remarks along with rape and death threats[37]. Later that year, Jennifer Hepler, became the target of online harassment when she attempted to make games more accessible and LGBT friendly where she was a game writer at Bioware[38]

Besides loss of capital due to high rates of female attrition, the forecasted growth in computing jobs that companies cannot currently fill, and the value of diversity in innovation, productivity, and competitiveness, the shortage of varied perspectives also means that those developing new technology do not reflect the customer base. This could lead to customer dissatisfaction when companies lack input from 52 percent of the global population, but more importantly can contribute to an imbalance of power as these technologies, born out of the male perspective, are permeating more aspects of everyday life. For example, all software versions of a helper are female (Apple's Siri, Amazon's Cortana)[39] which reinforces the role of women as assistants. Equal participation from men and women in the workplace can lead to a more equal process in the shaping of society and the future. The knowledge economy, specifically the high-tech sector, is a driving force behind far-reaching cultural changes. We should be cautious to accept the values of the corporate tech into broader society.

On the city/regional level, how does this phenomenon affect the areas with thriving high-tech economies? In Seattle, how are the gender disparities associated with high-tech industry culture caused and what are the effects on a local level? What are the overall trends in high-tech business establishments overtime and how is this related to the overall employment and separation rate for women in the area's high-tech industry? Does the dominating culture of Amazon or Microsoft infiltrate small businesses and startups or are they an opportunity for possible participation and inclusion?

[36] Edidin, Rachel. "She Was Harassed By A Games Reporter. Now She's Speaking Out." Kotaku. Gawker, 28 Jan. 2014; McNeil, Joanne. "Stop Erasing Women From Tech History." Medium. 3 July 2014; Rae, Jetta. "GamerGate's Economy Of Harassment And Violence." Ravishly. 20 Oct. 2014.

[37] McDonald, Soraya. "'Gamergate': Feminist Video Game Critic Anita Sarkeesian Cancels Utah Lecture after Threat." The Washington Post, 15 Oct. 2014. Web. 13 Mar. 2015.

[38] Sampson, Tim. "BioWare Writer Targeted with Harassment, Death Threats Leaves Job." The Daily Dot. 1 Aug. 2013. Web. 13 Mar. 2015.

[39] Wheeler, David. "Opinion: Why Are Cortana and Siri Female?" CNN. Cable News Network, 4 Apr. 2014.

METHODS

The entrenched gender disparity issues in corporate technology culture suggested a need to examine areas that have been economically developed around these firms.

To gain an understanding of the causes and consequences that high-tech industry culture has on Seattle, social sentiment was investigated in correlation with quantitative data. This started with research in local news sites and blogs for articles related to 'women in technology' and related phrases. The sources included local high-tech news webpage 'Geekwire', the alternative area paper 'The Stranger', traditional sources such as 'The Seattle Time," and when events or sentiment became nationally newsworthy sites such as 'Salon' became useful. In total thirty articles/blogs were collected from the years 2009-2015 (January through March). Articles on gender and the tech industry did not seem to appear for this locality prior to that period.

The articles were then coded using Nvivo software for reoccurring themes and mentions. Counts of theme references and words were cross-examined with years, mentions of corporate tech-giants such as Amazon or Microsoft, and gender of author. This information was then examined side by side with quantitative data on employment, separations, and ownership as well as major industry events.

DEFINITIONS

The study area is defined as King County, Washington. This includes the city of Seattle, Bellevue, Redmond, and 36 other incorporated areas. King County was chosen because it best included all of the major areas for tech establishments and employment (see Figure 2).

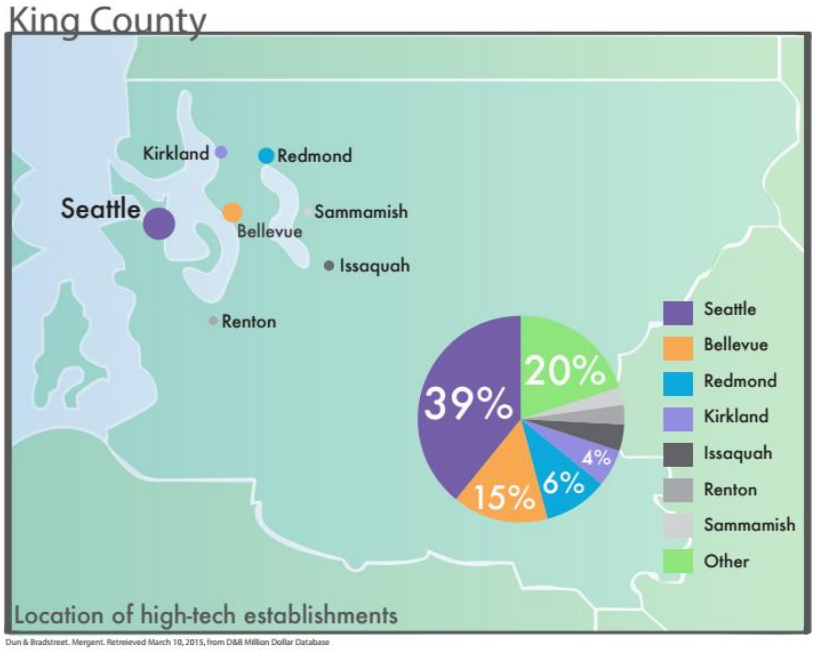


FIGURE 2: FROM DUN & BRADSTREET

High-tech industry has been defined in this study using "Occupational employment by industries data", to determine which industries employ the highest percentage of software developers[40]. These are Software Publishers (NAICS 5112), Electronic Shopping and Mail Order Houses (NAICS 4541), and Computer Design Services (NAICS 5415). For QWI data including firm size and age, NAICS 54 and NAICS 51 were used in proxy for the four-digit codes due to data limitations.

Business sizes were investigated through the available categories in the QWI data: a small business will be defined as having less than ten

[40] Employment Security Department, State of Washington, Q2, 2013

employees and a large business will be defined as having more than 1000 employees.

THEMES

The main questions of this paper are examined through two themes that give insight to specific trends in employment and ownership in Seattle's high-tech establishments. These themes are Women Ownership and Employment and Startup and Small Business Trends.

When examining **Women Ownership and Employment** the following questioned will be answered:

- How do female ownership and employment compare in Seattle's high-tech industry? And how does this correlate with social sentiment?
- What are the local causes and consequences of continued gender disparities in the high tech industry?

Female ownership of tech companies will be determined using Dun and Bradstreet, which has all current businesses and employment will be found through Quarterly Workforce Indicators, which has historic information from 1990 to 2013.

The process began with collecting the data from Dun and Bradstreet on current business establishments which allowed for the calculation of percent women owners in high-tech. Then this was compared to QWI data on overall female employment in high tech and percent of businesses with female executives (from D&B). The year established data on Dun & Bradstreet was compared between male and female owned businesses. Quarterly Workforce Indicators (QWI) were used to observe trends in the ratio of men to women employed in tech to understand who has been benefiting from the growth of the high-tech industry. Using the same dataset, the changes in separation rates for men and women employed in high-tech were examined and compared to the changes employment over time (1990-2013).

Then, the previously mentioned thirty articles relating to Seattle women in tech were used to add depth and context to the QWI and D&B data. Nvivo coding software was utilized to identify themes and trends over time. References were counted and compared within the qualitative data set, then compared to the quantitative secondary data.

This data will show if there is a relationship between female owned businesses and other forms of female participation in high-tech. It will also show the relationship between these trends and social sentiment towards women in technology.

The **Startup and Small Business Trends** theme will answer the following questions:

- Do start-ups and/or small businesses function as a means of inclusion for the high-tech industry in Seattle?
- What are the overall trends in high-tech business establishments overtime (CBP 2000-2012) and how is this related to the overall employment and separation rate for women in the area's high-tech industry (QWI 1990-2013)?
- How do these trends relate to local social sentiment in news articles and blogs?

QWI information was used to determine the percent of female employees in the industry over time (1990-2013) and then compared to establishment size. QWI data was also used to see changes in female employment in different firm sizes and firm ages. This data was related back to information in previous social sentiment findings.

The datasets were chosen by examining similar studies. Quarterly Workforce Indictors have been used in previous studies for similar purposes. Matthew L. Freedman's 2008 "Job hopping, earnings dynamics, and industry agglomeration in the software publishing industry" utilized QWI data to understand the implications of industry clusters on labor mobility and earning dynamics[41]. In Michael Hicks' 2005 study, he uses QWI to determine Wal-Mart's local impact on wages and employment dynamics[42]. Dun and Bradstreet data is widely used as well, it is named as a resource for entrepreneurship research in "Entrepreneurship Databases: Illuminating Processes, Describing Phenomena and Steering Research" from 2012 and used for the annual Kauffman Firm Survey (2004-current)[43] Wages and anti-competitive behavior were computed using D& B in a 2012 study by Bonanno and Lopez[44].

HYPOTHESIS

The outcome of the analysis will most likely show a lower percentage of businesses owned by women than the percent of women employed in the industry and the percent of establishments with female executives. If women are being pushed out of hostile work environments in large companies, they could be starting new business which could show that on average, businesses owned by women are younger. There could be more positive social sentiment towards women in tech start-ups than women in large tech companies because they do not have entrenched company culture.

Even as more women have achieved the necessary qualifications for high-tech employment, there might be a decline in the percent of women employed in these industries due to the dominance of large companies with male-centric culture in Seattle. For the same reasons, there could be higher separation rates for women in high-tech recently. As companies like Amazon came to the area, the separation rate for women in the industry might have risen.

Startups and small businesses will function as a means of inclusion for the high-tech industry in Seattle. The trend in high-tech establishments will be a higher percent f female employment in startups and small businesses. There will be a higher percentage of establishments with female executives in small businesses. Combining information from these data sources will shed light on the relationship between employing and retaining women in high-tech and the size of establishments.

DATA LIMITATIONS

As private companies, Amazon and Microsoft do not have to report employment by gender. The public has demanded diversity reports, most recently Jesse Jackson and Rainbow PUSH called for Amazon to publish the gender and racial makeup of their workforce[45]. Microsoft and Amazon's reports reflect largely male workforces, with fewer

[41] Freedman, Matthew L. "Job Hopping, Earnings Dynamics, and Industrial Agglomeration in the Software Publishing Industry." Journal of Urban Economics (2008): 590-600.
[42] Hicks, Michael. "What Do Quarterly Workforce Dynamics Tell Us About Wal-Mart? Evidence from New Stores in Pennsylvania." IHS Global Insight (2005).
[43] Rogoff, Edward. "Entrepreneurship Databases: Illuminating Processes, Describing Phenomena and Steering Research." Entrepreneurship Research Journal (2012).
[44] Bonanno, Alessandro, and Rigoberto A. Lopez. "Wal-Mart's Monopsony Power in Metro and Non-metro Labor Markets." Regional Science and Urban Economics (2012): 569-79.
[45] Guynn, J. (2014, September 3). Jesse Jackson targets Amazon.com over diversity. From USA Today

women represented in positions of leadership. The issue with these reports is that they are reported on global and national levels, without specific occupation data. Especially for Amazon, these numbers are less useful for understanding gender bias in tech employment given that they employ a wider variety of occupations than more software based companies like Microsoft. PayScale data is somewhat more helpful but it is compiled from voluntary, crowd-sourced employee information.

There were similar issues in getting specific data that included a small geography and four-digit NAICS. For example, the Census/American Community Survey does not provide wage gap information for industry codes that match up to NAICS and they are very broad umbrella categories.

Quarterly Workforce Indicator (QWI) data was very helpful for finding employment by gender in specific four-digit NAICS, but these results could not be broken down by age of establishment or size of firm. To look at those numbers, only two-digit NAICS could b used, which makes the analysis less generalizable to high-tech. The figures of stacked graphs below (figures 3 and 4) show the difference in employment by gender when looking at Information (NAICS 51) and Professional, scientific, and technical services (NAICS 54) combined (NAICS 45 was not used because it includes mostly non-technical retail) and when looking at the Software Publishing (NAICS 5112), Computer Design Services (5415), and Electronic Mail Order Houses (4541) combined.

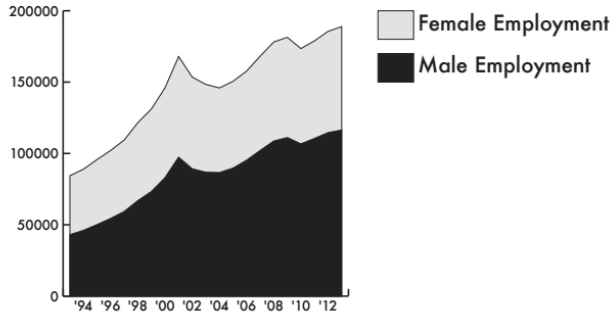


FIGURE 3: NAICS 51 AND 54

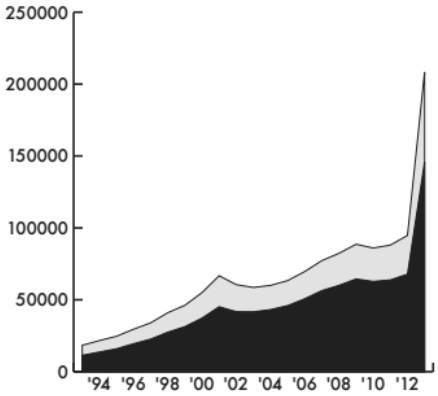


FIGURE 4: NAICS 5112, 5415, 4541

When examining these two charts, it is obvious that the specific four-digit tech sectors have a stark gender disparity, while the larger industry sectors have much less of an issue. This means that data analyzed for gender employment by establishment year and firm size are not as meaningful to the specific industries. Along the same line of questioning, there is no data source that shows gender separation by establishment size.

For the social sentiment analysis, there would ideally be more blogs written on the subject for this specific geography to have more significant results.

BACKGROUND

SITE DESCRIPTION

Seattle has emerged as one of the hotly contested sites of these newly perceived inequalities. Eighteen percent of the nation's Software Publisher employees work in King County[46]. Of these employees, 52 percent are classified as Software Developers, the highest fraction of this occupation in any area industry[47]. This heavily male dominated occupation is high earning and experiencing continued growth. In recent years, Software Developer has overtaken Retail Salesperson as the top occupation in King County[28].In King County, those employed at Software Publisher companies (NAICS 51121) earn one of the top salaries in the area, at $3,683 per week[48]. Of the top occupations in King County, Software Developer shows the strongest growth projection; 3.02 percent between 2012 and 2017[49].

Between 2001 and 2013, the Information sector (NAICS 51) gained a net 5,172 jobs in King County. Broken down by gender, men gained 7,011 jobs while women lost 1,839 jobs in the sector[50]. In the Information sector, women make 67 percent of men's salaries, lower than the area average for all industries[51]. In 2012, the Software Publisher sub sector accounted for 59 percent of Information sector employment, up from 42 percent in 2001[52]. As Software Publishing grows, women are losing jobs in this sector.

The Seattle area is home to several large tech firms that have been recently criticized for their employment patterns[53]. Amazon located in the city of Seattle's South Lake Union neighborhood in 2008 and Microsoft has grown out of Bellevue, a nearby suburb. The figure below shows the location of high-tech establishments in King County[54]. Other large tech companies with locations in and around the city of Seattle include, Google, Facebook, Nintendo, TMobile, Dropbox, Expedia, Cisco, Adobe, Zillow, and Woot. These companies may have a variety of industry classification, but they commonly employ large percentages of Software Developers. Many of these companies have released diversity numbers that illustrate the gender disparity in employment.

Amazon is classified as an "Electronic Mail-Order" company, an industry with Software Developer as its top occupation and the third highest percentage of Software Developers in King County[55]. According to Amazon's third quarter report (10/23/14), the company currently employs 149, 500 full and part time employees globally, not including contracted or temporary workers. This is nearly 40,000 more employees than were reported in the same quarter last year (10/24/13)[56]. Amazon

[46] Quarterly Census of Employment and Wages, for US totals and Kind County, 2013
[47] Employment Security Department, State of Washington, May 2014
[48] Quarterly Census of Employment and Wages, for King County, 2013
[49] Employment Security Department, State of Washington, May 2014
[50] United States Bureau of the Census, "Quarterly Workforce Indicators", LEHD (2001 and 2013)
[51] United States Bureau of the Census, "American Community Survey", (2009-2013)
[52] US Bureau of the Census, County Business Patterns (2001-2012)
[53] Bishop, T. (2014, May 12). Too many dudes: Amazon's growth is ruining Seattle's dating scene, says single guy. from Geekwire
[54] Data on map from Dun & Bradstreet. Mergent. Retrieved March 10, 2015, from D&B Million Dollar Database
[55] "Occupational employment by industries, 2013, Q2," Employment Security Department, State of Washington, May 2014
[56] Quarterly Results. (2003 and 2014). Investor Reports. Amazon.com

owns 1.7 million square feet and leases 2.5 additional square feet of office space in the city of Seattle[57]. They have another 4.7 million proposed or under construction, allowing for the possibility of doubling their Seattle workforce. There are currently 9,920 open jobs listed on Amazon's career website and half of them are located in Seattle (1/20/15)[58]. Of the 4,990 Seattle openings, 38 percent are under the Software Development category, the largest category of opening by 28 percentage points.

37 percent of Amazon's global workforce is female and 25 percent of its global managers are female[59]. Globally, Microsoft employs 29.1 percent females and in tech positions only 16.6 percent[60]. PayScale, a real-time database of company salaries and statistics, has a collection of 1,249 entries on Amazon, 88 percent are out of the Seattle office. The site reports a gender breakdown of 27 percent female and 73 percent male, with the salary range for women at $49,124-$107,095 and the salary range for men at $63,071-$122,614[61].

In an article titled "'Armageddon': How Amazon's culture is taking a toll on Seattle's future," author Jeff Reifman, a former Microsoft employee details his concerns regarding the industry giants' widely felt impact[62]. He discusses how Seattle experienced the steepest rent hike among major US cities between 2010 and 2013, growing by 12 percent in 2013 alone[63]. Reifman also reports that Seattle is the fifth whitest city in the country, and the percentage of white population grew between 2010 and 2013. During the same time period, he says, "that pay equity has declined as Amazon's grown." Politico ran an article stating that the increase in the gender a gap in Seattle, was the largest of any US city[64]. Reifman forecasts that Amazon will make its mark on Seattle, leaving the city "more male, more white, wealthier and less diverse, unaffordable to those with lower incomes." He details issues surrounding the local wealth gap, corporate political influence, and diversity, calling Amazon "dumb on diversity." He quotes Tarah Wheeler, CEO of Seattle startup Fizzmint who says,

> *"Just look on South Lake Union streets…the men and women are very often separated by gender. That's not men and women avoiding each other. That's high-prestige/low-prestige workers hanging with their own."*

Figure 5, from 'The Stranger' shows the perception of Amazon's presence in Seattle: a massive force. The effect of the large high-

FIGURE 5: "IS AMAZON THE REASON RENTS ARE GOING UP" ILLUST. BY M KAUFMAN

[57] Bhatt, S. (2014, November 12). Amazon expands footprint with latest plan for more buildings. From Seattle Times.
[58] Amazon Jobs. (2015, January 20). from http://www.amazon.jobs/
[59] Diversity at Amazon. (2014). Amazon.com
[60] Inside Microsoft. (2014). Microsoft Webpage
[61] PayScale, 2015
[62] Reifman, J. (2014, November 19). 'Armageddon': How Amazon's culture is taking a toll on Seattle's future. from Geekwire
[63] Balk, G. (2014, September 8). Census: Seattle saw steepest rent hike among major U.S. cities. From Seattle Times
[64] Brodeur, N. (2014, October 14). Amazon's Company Town? From Politico

growth tech companies locating in Seattle has been documented in blogs and articles from a variety of perspectives. Concerns include increased rent[65], decrease of racial diversity[66], increase in gender wage gap[67], and pervasive brogrammer culture[68]. In Figure 4, the impact of Amazon has been illustrated as giant and overpowering. While economic growth in Seattle, spurred by tech industry success, has brought about an exciting time of growth; the nature, distribution, and impact of this growth should be examined.

STARTUP & SMALL BUSINESS POTENTIAL

Every society should strive for the participation of all its members to develop optimally. The high-tech growth in Seattle has been largely due to male-dominated firms like Amazon. Beyond tech giants, small businesses and startups make up a large percentage of industry establishments[69]. It is possible that they could provide a tool for the city to leverage the economic capital from women's participation in tech.

A study conducted by Level Playing Field Institute (LPFI), provides evidence that women may find more success in startups as opposed to large companies (such as Amazon). The study showed that women in startups were more satisfied with their work experiences than their male and female counterparts at large companies and that significantly less exclusionary cliques and unwanted sexual attention were experienced by women at startups[70]. It was also found that women in large STEM companies reported the highest rates of negative experiences of any group in the study. The LPFI study showed that women in startups were much more likely to endorse companywide practices to increase diversity than their male counterparts, perhaps pointing to women owned tech startups as a potential solution to gender disparity issues. A Kauffman study titled "Sources of Economic Hope: Women's Entrepreneurship" found that women started high-tech companies because the startup culture appealed to them (76 percent), also working for someone else did not appeal to them, and less than 3 percent said that not being able to find traditional employment was a motivating factor[71]. Harvard Business Review's Athena Factor report showed that of the 56 percent of women that quit their tech jobs, 49 percent continue to use their training. Of these women, 22 percent are self-employed, 17 percent have a job in government or non-profit, and 10 percent start-up a company[72].

Women entrepreneurs represent a large untapped resource for generating jobs and high-growth business. Currently, women start about 30 percent of businesses in the United States (Center for Women's Business Research) and even less in science and engineering (National Minority Small Business Owner data). Kauffman reports that women business owners have had fewer failure experiences than men (Coleman and Robb 2012 and 2014), but they

[65] Kiley, B. (2014, June 4). Is Amazon the Reason Rents Are Going Up? From The Stranger
[66] Reifman, J. (2014, November 19). 'Amageddon': How Amazon's culture is taking a toll on Seattle's future. from Geekwire
[67] Balk, G. (2014, September 23). Did Amazon's growth widen the gender pay gap in Seattle? From Seattle Times
[68] Romano, T. (2014, May 23). Amazon Is Killing My Sex Life. From Dame Magazine
[69] County Business Patterns
[70] Level Playing Field Institute. "The Tilted Playing Field: Hidden Bias in Information ..." 2011.
[71] Robb, Coleman, and Strangler. "Sources of Economic Hope: Women's Entrepreneurship." Kauffman Foundation (2014).
[72] Hewlett, Servon, Sherbin, Shiller, Sosnovich, and Sumberg. "The Athena Factor: Reversing the Brain Drain in Science, Engineering, and Technology." HBR Research Report (2008).

also face more challenges. Some researchers attribute women's lower levels of participation in growth oriented entrepreneurship to gender differences in key resource inputs including smaller amounts of venture capital (Fairlie & Robb 2009, etc). A recent study on inequality and startups showed that urban tech startups are not worsening inequality, leaving room to advance opportunities for a broader range of citizens[73].

One concern about the local startup cycle is the stifling force of Amazon's hiring. According to GeekWire, a Seattle tech podcast, the demand from large tech companies is resulting in less area tech startups. Another concern are the challenges women face before they are able to startup a company. For example, 96 percent of venture capitalists are men[74].

LITERATURE REVIEW

In an increasingly global economy, cities and regions are searching for paths to stay competitive. Bolstering local clusters, especially in high growth areas such as high-tech related industries, has been one strategy for areas to achieve regional advantage. Michael Porter describes clusters as "concentrations of highly specialized skills and knowledge, institutions, rivals, related businesses, and sophisticated customers in a particular nation or region. Proximity in geographic, cultural, and institutional terms allows special access, special relationships, better information, powerful incentives and other advantages in productivity and productivity growth that are difficult to tap from a distance"[75]. Porter asserts that clusters form a self-perpetuating cycle that stimulates growth. As cities and regions achieve this growth, they need to consider the costs.

From the Local Government Commission (2004):

> *"One of the biggest myths is that in order to foster economic development, a community must accept growth. The truth is that growth must be distinguished from development: growth means to get bigger, development means to get better- an increase in quality and diversity"*[76]

Economic development should include comprehensive concepts of quality of life, social cohesion and wellbeing with continued concerns about competitiveness (Pike, 50). This means examining how a regions' economy affects women. Conventional methods of regional policy and planning have ignored the particular interests and full participation of women. For a regional economy to reach full potential, women need to be identified as capable actors with potential for regional development[77]. Today in high-tech the potential of women's contributions remains undervalued. Policy interventions including support for tech-cluster formation, the promotion of entrepreneurs or the establishment of technology centers tend to increase the development of male-dominated work settings, thus inhibiting the potential economic contributions of women in the region[2].

Despite the acknowledgment of the implications of economic gender divisions,

[73] Florida, Richard. "Tech Culture and Rising Inequality: A Complex Relationship." 2014.
[74] CB Insights (2010)
[75] Porter, M. E. "Location, Competition, And Economic Development: Local Clusters In A Global Economy." Economic Development Quarterly (2000): 15-34.
[76] Pike, Andy, and Andre Pose. Local and Regional Development. London: Routledge, 2006. (From Government Commission 2004)
[77] Aufhauser, Herzog, Hinterleitner, Oedl-Wieser, and Reisinger. "Principles for a 'Gender-sensitive Regional Development'" Instutut Fur Geographie Und Regionalforschung (2003).

analyses of the learning region and the geography of innovation are "largely gender blind" which ignores the female employee's experience and the markedly gendered patterns of labor in related industries[78]. To gain the full contribution and innovative capabilities of the female workforce, issues related to for the individual employee need to be clearly joined to the issue of firm and city economic competiveness. In the study of Cambridge's high-tech regional economy, it is found that "social, cultural, and institutional endowments shape local employment relation," in ways that both contribute to and restrain economic growth. The dominant cluster culture enforces a masculinized environment where characteristics associated with women are devalued. This not only causes harm to individuals, but to the regional competitiveness[79].

Regions pursuing technology and innovation for growth and development are characterized by a growing gap between female and male incomes. Though some women are able to tap into the new opportunities, many increasingly find themselves in the service industry with ever declining wages. Research from Richard Florida on the Creative Class and economic development has spurred a frenzied effort by multiple cities, nationwide to compete to draw knowledge economy firms and the related workforce. His work has been criticized in academic literature for its general lack of consideration in relation to concepts such as race and gender. Florida assumes a homogeneous labor pool, where gender and race do not matter despite the powerful structural division in the occupations he references[80]. Parker (2008) notes that while underrepresented groups may participate in these occupations, they face high barriers to entry and are required to function within male-created norms and leadership[81]. This has been especially argued for the "most creative occupations" including information technology where labor practices empower gender inequality[82] and the reproduction of masculine workplace cultures create harmful spaces for women[83]. The new Creative Class economy and tech industry assume meritocracy but perpetuate old-school sexism.

In her 2012 paper "Women's Empowerment and Economic Development," Esther Duflo states that development itself can increase women's empowerment, while at the same time empowering women will "bring about changes in decision-making, which will have a direct impact on development"[84]. She extends this idea to imply that policy actions that favor women have to be continued for both economic development and empowerment ("possibly for a very long time.") This policy challenge, generally regarded as a women's issue, is framed as an economic issue that affects everyone in a 2011 paper by Lesa Mitchell. In "Overcoming the Gender Gap: Women Entrepreneurs as Economic Drivers," Mitchell

[78] Gray, and James. "Connecting Gender and Economic Competitiveness: Lessons from Cambridge's High-tech Regional Economy." Environment and Planning (2007).

[79] Gray, and James. "Connecting Gender and Economic Competitiveness: Lessons from Cambridge's High-tech Regional Economy." Environment and Planning (2007).

[80] Leslie, Deborah, and John Paul Catungal. "Social Justice and the Creative City: Class, Gender and Racial Inequalities." Geography Compass (2012): 111-22.

[81] Parker, B. (2008). Beyond the class act: gender and race in the 'creative city' discourse. In: Desena, J. N. (ed) *Gender in an urban world*. Bingley, UK: Emerald Group Publishing, pp. 201–232.

[82] Kelan, E. K. (2007). 'I don't know why'– accounting for the scarcity of women in ICT work. *Women's Studies International Forum* 30, pp.499–511.

[83] Leslie, Deborah, and John Paul Catungal. "Social Justice and the Creative City: Class, Gender and Racial Inequalities." Geography Compass (2012): 111-22.

[84] Duflo, E. (2012).Women Empowerment and Economic Development. Journal of Economic Literature.

brings together recovery from the 2009 recession and the status of women in the workforce, specifically in startups. While many see efforts to encourage female entrepreneurship as a part of gender equity or for the benefit of women, she provides evidence that these efforts are key to job creation and sustainable growth. Her assertions are nicely summed up in this quote:

> *"Women capable of starting high-growth companies may well be our greatest under-utilized economic resource*[85]*."*

The following section brings this quote to life through secondary data analysis of Seattle's high-tech business and workforce.

[85] Mitchell, L. (2011). Overcoming the Gender Gap: Women Entrepreneurs as Economic Drivers. Ewing Marion Kauffman Foundation.

ANALYSIS

In the Seattle area, only eight percent of current tech businesses are owned by women[86] (Figure 6). Older companies are more likely to have a female owner: four percent of tech firms started in 2014 are owned by women, compared to thirty percent for establishment years 1980 and 1987 (Figure 7).

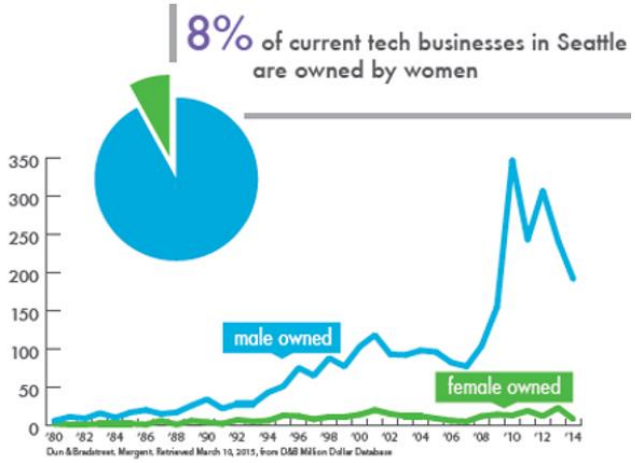


FIGURE 6: FROM DUN & BRADSTREET

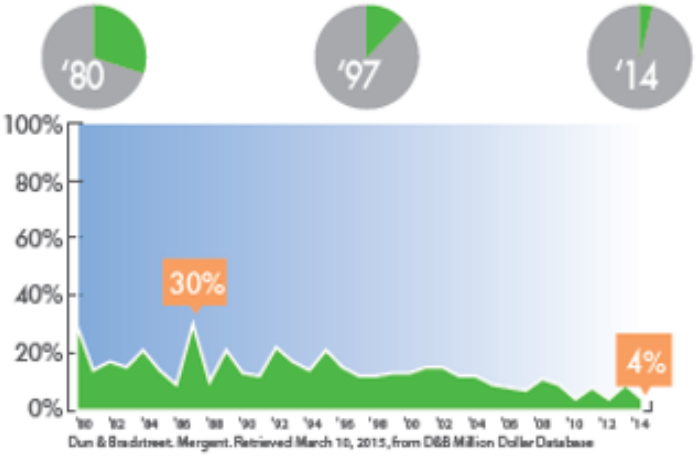


FIGURE 7: FROM DUN & BRADSTREET

The average female owned business was started in 2001, compared to 2005 for male owned businesses. Of these companies, 79 percent of executives listed used 'Mr.' as a title with only 21 percent using 'Ms'. Businesses owned by men has three times more employees on average[87].

Percent female employment in tech decreased nearly every year between 1991 and 2013 (Figure 8). In 1991, women represented 39 percent of tech employees in Seattle, this dropped to 31 percent in 2002, and only 29 percent in 2013. In the 1990s, male and female

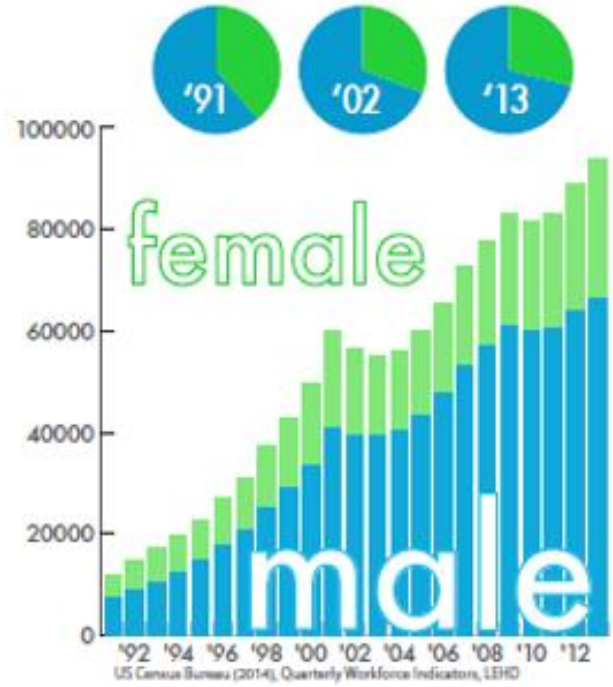


FIGURE 8: FROM QUARTERLY WORKFORCE INDICATORS

separation rates were equal to their share of employment but, around 2000, women started to

[86] Dun & Bradstreet. Mergent. Retrieved March 10, 2015, from D&B Million Dollar Database

[87] Dun & Bradstreet. Mergent. Retrieved March 10, 2015, from D&B Million Dollar Database

become over represented in separations and this gap has continually grown [88] (Figures 9 and 10).

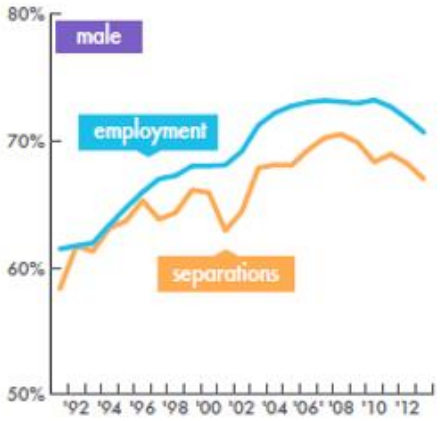


FIGURE 99: FROM QWI

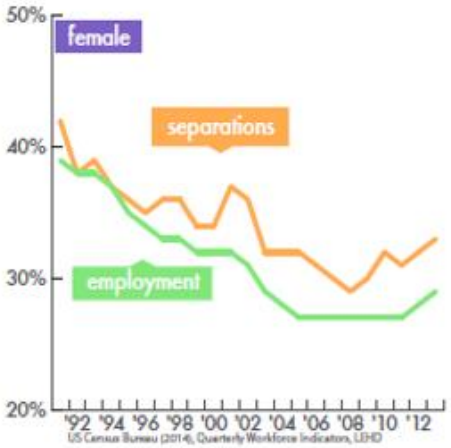


FIGURE 100: FROM QWI

The pay gap improved between 1991 and 2013, so why are women still leaving tech? They currently earn four percent less of the payroll than their share of employment, compared to thirteen percent less during the tech boom and thirteen percent in the early nineties[53] (Figure 11).

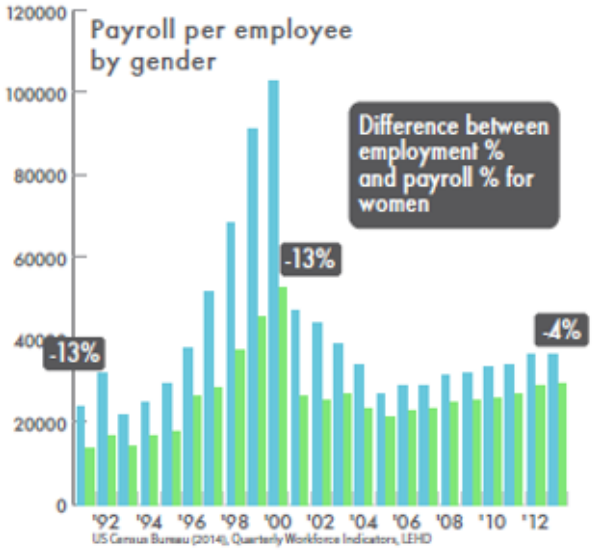


FIGURE 11: FROM QWI

To better understand the local causes and consequences of continued gender disparity in Seattle's high-tech industry 30 articles discussing women in tech from 2008 to 2015 in the area have been analyzed for themes and trends.

The reoccurring themes were descriptions of a male-centric industry culture, discussing gender disparity in high-tech, positive experiences of women, and negative experiences of women. These themes were observed in correlation with secondary quantitative data, events over the time period, and mentions of small or large companies to examine startups and small businesses as a means of inclusion for Seattle's high-tech industry.

Of the four themes, gender disparity in the industry has the most mentions (112) and was found in 23 of the 30 sources. This was followed by negative female experiences (83), found in 18 of the sources, and then descriptions of the culture (81) from 20 sources. Positive

[88] US Census Bureau (2014). QWI, LEHD

experiences of women had 13 mentions in nine articles.

The articles, from 2008 to 2015, are not evenly spread out over the time period. There are only five articles from 2008 to 2012, six from 2013, 16 from 2014, and four from 2015 (January 1- March 25). The articles began to appear in 2008, around the time that Sheryl Sandberg, Facebook CEO released her book "Lean In." This correlates with national Google trend data. The 2008 article was run on the blog portion of The Stranger, an alternative newspaper in Seattle. It was written from a feminist perspective and detailed misogyny at a tech conference as part of a larger trend[89].

Articles in 2010[90], 2011[91], and 2012[92] discuss the gender disparity in the industry and local programs directed towards women such as Geek Girl Con and a women's startup weekend (there was pushback against this, calling it discriminatory).

Interest started to pick up in 2013, with Geekwire[93] (Seattle tech blog), Seattle Met[94], and Seattle Times[95] all posting articles relating to Seattle women in tech; some questioning the culture of large firms and some mentioning Seattle's high ranking for women entrepreneurs.

The year 2014 had the largest amount of articles on this topic and the only year with national attention to Seattle women in tech. This started in May when Jeff Reifman wrote, "You've got Male: Amazon's Growth Impacting Seattle Dating Scene.[96]" It was then covered by Geekwire and soon picked up nationally, garnering responses from all over the country. According to his blog, the post had "21,846 page views, more than 2,000 Facebook recommends, 154 tweets and 78 comments" (not including activity from reposting and republishing)[97]. This is arguably when Seattle's gender disparity issue in high-tech went from a women's issue to a mainstream problem. Why? The men of Seattle found Amazon's questionable hiring practice and company culture to finally be affecting them personally- in their dating lives. Reifman's article describes a shift in the ratio of men to women in the area and complains about how challenging it is to get a date. 2014 is the only year that there were more male authors of the collected articles than female authors, before 2014 there had only been one male author in the topic in the area. So far, 2015 has shown about equal interest from male and female authors.

[89] Barnett, E. (2008, April 24). The Stranger.
[90] Pasulka, S. (2010, September 1). Too Few Women in Tech? Stop Telling People How They Should Feel About It. From Geekwire
[91] Han, L. (2011, September 21). Seattle Wonder Women Launch GeekGirlCon. From Seattle Met
[92] Guzman, M. (2012, June 23). Women in tech: Is Startup Weekend Women's Edition fantastic or flawed? From Geekwire
[93] Soper, T. (2013, May 1). Life in Code: Why this entrepreneur is telling the stories of women in tech. from Geekwire; Soper, T. (2013, April 9). Seattle ranks 2nd for women entrepreneurs but has the worst gender wage gap in America. From Geekwire.
[94] Halverson, M. (2013, January 23). Tarah Wheeler Van Vlack Fights for Women in Tech. From Seattle Met.
[95] Pian Chan, S. (2013, March 22). Are tech companies indifferent to women in the workplace? From Seattle Times; Pian Chan, S. (2013, March 20). Sheryl Sandberg, "Lean In," the gender gap in Seattle leadership. From Seattle Times.
[96] Reifman, J. (2014, May 12). You've got Male: Amazon's Growth Impacting Seattle Dating Scene.
[97] Reifman, J. (2014, June 10). Amazon's Impact on Seattle Dating.

FIGURE 12 FROM SALON: CREDIT: AP/REED SAXON/NAS
CRETIVES VIA SHUTTERSTOCK/SALON

Another event that took place in 2014 (October), was a contentious comment made by Satya Nadella, CEO of Microsoft (a Seattle-based company) at a conference celebrating women in computing. He asserted that women should not ask for raises but rather trust karma[98]. He later announced that he was "completely wrong" stating that it was reflective of bias in the industry.

The fact that articles on this subject started around 2008 not only correlates with national trends and local events, it also follows the quantitative data found on the area's industry. Today, only 8 percent of tech businesses are owned by women. Older tech companies are much more likely to be owned by women; 30 percent of current businesses established in 1980 are owned by women, compared to only 4 percent of businesses established in 2014. These single digit ownership numbers started in the late 2000s[99].

Percent of females employed at tech firms in Seattle also decreased in the late 2000s, after decreasing almost every year since 1991. And this is not just because women are not applying for jobs or being hired; female employees have become increasingly overrepresented in separations since the early 2000s tech boom[100]. Payroll disparities have actually improved over time and are not as unequal as other industries, pointing to other gender issues such as hostile company culture.

FIGURE 113 FROM SEATTLE MET

To identify issues in industry culture, themes were broken down by reference to large companies and startups. Overall there were more than six times as many negative experiences mentioned by women than positive experiences. There were no positive female experiences associated with Amazon or Microsoft. Gender disparity mentions overlapped with Amazon 12 times, one article referring to the company environment by saying "Welcome to Dudeland"[101]. Microsoft had 19 gender disparity references: "Male-dominated"[102]. Startups had 10 gender disparity mentions: "The tech and startup industry is

[98] Tu, J. (2014, October 10). Nadella's advice to women on raises comes back to bite him. From Seattle Times.
[99] Dun & Bradstreet. Mergent. Retrieved March 10, 2015, from D&B Million Dollar Database
[100] US Census Bureau (2014). QWI, LEHD
[101] Robinson, K. (2014, August 1). Broverwhelmed: Gender Disparity in Seattle. From Seattle Met.
[102] Pian Chan, Sharon. "Are Tech Companies Indifferent to Women in the Workplace?" The Seattle Times. 20 Mar. 2013. Web. 18 Feb. 2015.

certainly dominated by men"[103]. Most mentions of positive experiences by women in the industry were related to programs directed toward women or to women only tech conferences: "Most of the women said they were inspired by the event[66], "and "It was such a unique opportunity to spend time around so many smart, engaging, and geeky women[104]." This points to city-backed solutions to bolster this community. Figure 14 comes from one of these articles and shows a much more empowered group of women, as compared to Figure 13 which was from an article describing a woman's interview process at Amazon in Seattle.

FIGURE 124 FROM SEATTLE MET

There were some positive references around women and entrepreneurship, but there are issues with the data presented in the articles. For example, Seattle was declared one of the top cities for female entrepreneurs in 2013[105] and 2014[106], but the methods were questionable. The criteria was (1) the number of businesses per 100 residents (2) percentage of businesses that are owned by women (3) median earnings for full-time female workers (4) percentage of residents 25 years or older with a bachelor's degree or higher[103]. Only two of the criteria relate to women specifically. The second, median earnings for women, does not take into account pay gap at all, mostly just having a high cost of living (which tech contributes to). Seattle has the highest gender pay gap of top metro areas in the United States (National Partnership for Women and Families, 2013) and this measure biases cities with higher cost of living. Overall, it does not seem like a good measure and if broken down by industry it still would not look good for women in tech. It seems like articles were more positive towards startups, but the actual evidence for more positive experiences by women just are not there.

Taking a closer look at the quantitative startup and small business data (QWI), one can see that younger tech firms had greater drops in percentage points for female employment. In 1991, companies aged 0-1 years reported 56 percent female employment (the highest of any category) but in 2013, just 36 percent female employment was reported (the lowest percent of any category)[107] (see Figure 15).

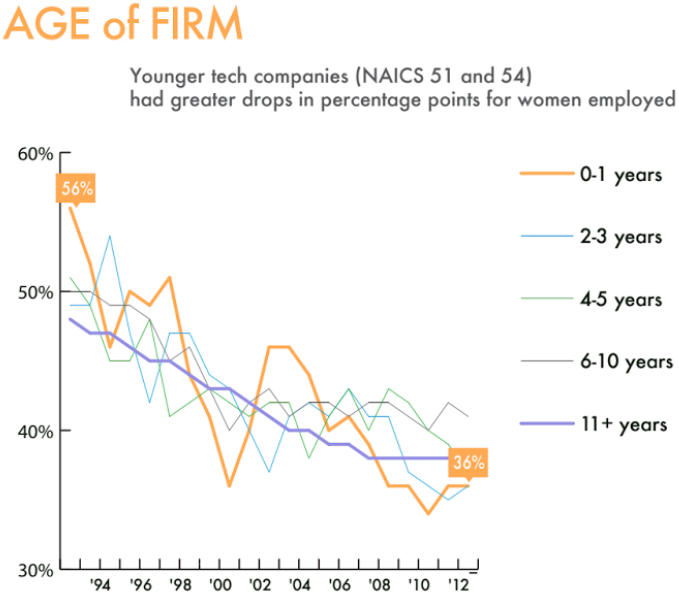


FIGURE 135 PERCENT FEMALE EMPLOYMENT BY FIRM AGE FROM QWI

[103] Soper, T. (2013, April 9). Seattle ranks 2nd for women entrepreneurs but has the worst gender wage gap in America. From Geekwire.
[104] Soper, T. (2013, May 1). Life in Code: Why this entrepreneur is telling the stories of women in tech. From Geekwire.
[105] Soper, Taylor. "Seattle Ranks 2nd for Women Entrepreneurs but Has the Worst Gender Wage Gap in America." GeekWire.
[106] "Girl Power: Seattle Ranks 3rd for Women Entrepreneurs - GeekWire." GeekWire. 18 Feb. 2014.
[107] US Census Bureau (2014). QWI, LEHD

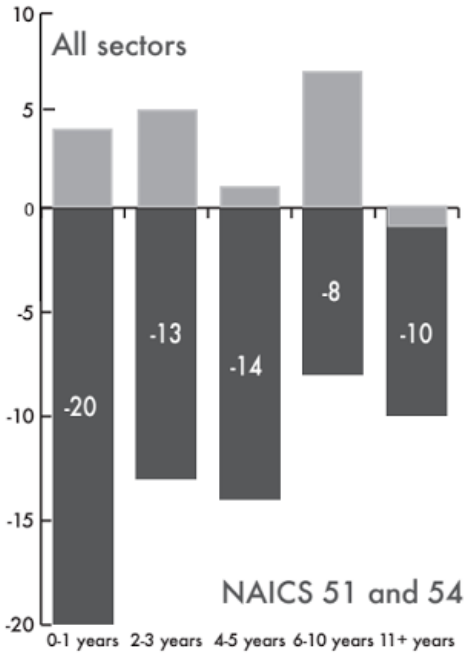


FIGURE 16: PERCENTAGE POINT CHANGES IN FEMALE EMPLOYMENT FOR FIRM AGE, FROM 1991 TO 2013 (QWI)

This trend did not apply to industries overall in Seattle (see Figure 16). When compared to all sectors, the major drop in percentage points or women employed in the sectors studied looks even more concerning. There were drops in the percentage of women employed for all ages of companies, but the worst drop was in startups. This could imply that startups are not hiring women or that startups have become a worse place for women to work.

Trends in company size show that larger tech companies had greater drops in percent of women employed (see Figure 17). Smaller companies (0-19) consistently employed a higher percentage of women and large companies (500 plus) consistently employed the lowest percentage of women[108]. This could be because women are more likely to own smaller firms or because the small firms do not have the small corporate culture as the larger firms.

Figure 18 displays trends in all sectors compared to high-tech by establishment size.

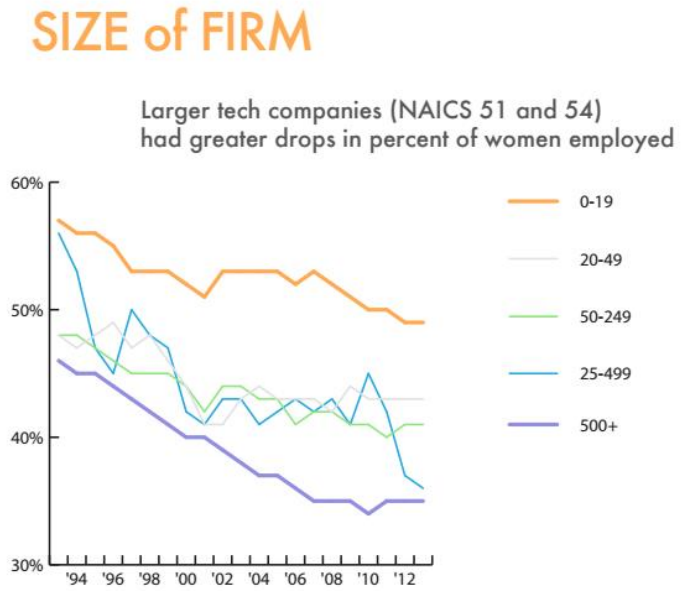


FIGURE 17 PERCENT FEMALE EMPLOYMEN BY FIRM SIZE FROM QWI

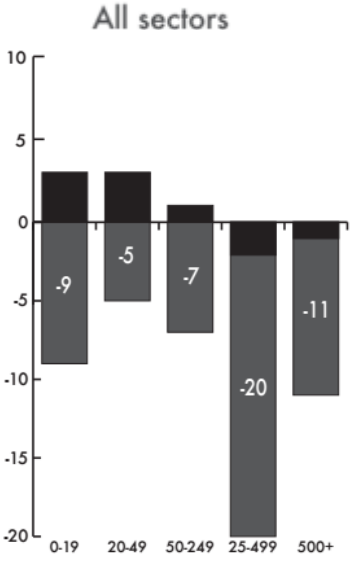


FIGURE 18 PERCENTAGE POINT CHANGES IN FEMALE EMPLOYMENT FROM 1991 TO 2013

[108] US Census Bureau (2014). QWI, LEHD

CONCLUSION

The local causes and consequences of continued gender disparities in the high-tech industry seem to be tied to large companies, and social sentiment points to hostile environments in specific firms like Amazon and Microsoft. The overall trends of female employment in high-tech have gotten worse as these tech giants have grown.

But, startups do not seem to be a means of inclusion for women today. In the past 20 years, startups went from having the highest amount of female participation to the lowest. They are spoken of more positively in local articles, but the secondary data seems to show that startups have gotten more male-dominated.

This does not mean that they are not a good avenue for attacking the issue. This seems to be a major problem that the city could actually contribute to solving. And supporting more women involved in startups could improve the abysmal high-tech establishment ownership numbers as well. This could foster a more inclusive culture in Seattle's tech economy.

The social sentiment analysis confirmed that the educational pipeline is not the only issue and literature suggests that retaining women in high growth sectors is integral to sustainable and equitable economic development. This means that gender equality is not just a women's issue, but a concern for cities and regions as a whole and it should be framed in this way.

Seattle has made progressive policy that has raised the minimum wage. To further improve working conditions, especially for women in tech they could implement policies that force firms to take sexual harassment seriously. After it was announced that they had the worst gender wage gap nationally, they created a Gender Equity in Pay Taskforce which focused on government practices and seemed to fizzle out within one year[109]. Seattle needs to get serious about industry issues.

There are some non-government organizations that have been working to close the gaps. Ada Developers Academy, "an intensive software development training school for women" opening in 2014 and offers free tuition. Their program is designed for women who do not have prior experience in software development and the graduates of their first cohort (15 women) all received job offers, averaging a $75,000 salary. The program has gained interest with 250 applicants for the next round[110]. This is one area where the city could step in to help them increase their capacity.

All-female programs such as this one, were referenced very positively in the social sentiment analysis. Making spaces within the community that lower the gendered barriers for entry into the tech community is something the city should invest in. The City of Atlanta recently committed to supporting a startup incubator for women. After a selection process, fifteen women will be chosen to reside and work in the new space, with access to best-in-class resources and top executives[111].

Commitment to gender equity in economic development needs to start now. The social sentiment analysis showed growing

[109] Sears, Kelton. "City Council Unanimously Adopts Plan to Fix Seattle's Gender Pay Gap." Seattle Weekly. 27 May 2014. Web. 18 Apr. 2015.
[110] Soper, Taylor. "Women-only, Tuition-free Coding School Ada Developers Academy Spins out of Tech Alliance." GeekWire. 2 Feb. 2015.
[111] Wenk, Amy. "Incubator for Women Entrepreneurs Coming to Downtown Atlanta's Flatiron Building." Atlanta Business Chronicle. 27 Jan. 2015.

dissatisfaction with current conditions and without intervention the problem will get worse. Many articles have come out that encourage women to 'lean in,' negotiate like a man, or change their behavior to succeed in tech culture. New movements from women in tech have challenged these ideas. Recently, Table Flip Club was established which emboldens women to opt out of sexist workplaces. Instead of playing by the rules of the workplace, "women are leaving your tech company because you don't deserve to keep us around." The movement aims to change men's behavior instead of women's. The movement encourages talking, organizing, lawyering up, fundraising, starting companies, and "angel investing in other women who are building amazing things"[112]. This has gained traction through Twitter in the Seattle region. The so-called meritocracy of tech will not last forever and Seattle needs to prepare by supporting women currently working in tech. To invest in an equitable economic development strategy in high-tech Seattle can provide services that bolster a gender diverse entrepreneurial ecosystem.

There are multiple ways that the city can remedy the issues detailed in this paper. Five are listed below: collaborating with successful area programs, creating a physical space for women in tech, making a public statement about the issue, listen to people involved and highlight repeatable success stories, and distinguish itself from Silicon Valley by coming together with tech leaders to commit to positive change.

1) Invest in and collaborate with successful programs, nonprofits, and/or conferences that empower women to participate in the area's high-tech economy, especially through startups. This could mean donation of space, staff, or grants to Ada Academy or the conferences that were positively regarded in the social sentiment analysis.
2) Create physical community spaces similar to the Atlanta example. Companies like Amazon and Microsoft have such a large and dominating physical presence that makes actual space for women in the city an important factor for fostering economic growth and empowerment in the area.
3) Publically commit to closing the gender gap, beyond municipal efforts. Seattle is known for progressive policy, but the city and state should not defer to the wants and needs of large tech companies. Recently, the City of Seattle announced a boycott of Indian due to the "religious freedom act" that allowed for discrimination against LGBT people[113]. It would be helpful to hear supportive statements similar to this one; Seattle needs to recognize this as an issue for the region as a whole so that collective action can be taken.
4) The city can also make sure that these sometimes hidden voices are heard and listened to. This could be something the Gender Equity in Pay Taskforce could take on. There could be meeting or focus groups that bring together individuals from all parts of the industrial ecosystem to understand what they are experiencing and what might already be working. Through this effort, they could also work with people who have found routes toward a positive working environment to highlight positive stories that have the potential to be repeated.
5) Seattle needs to distinguish itself as different as Silicon Valley. And in the

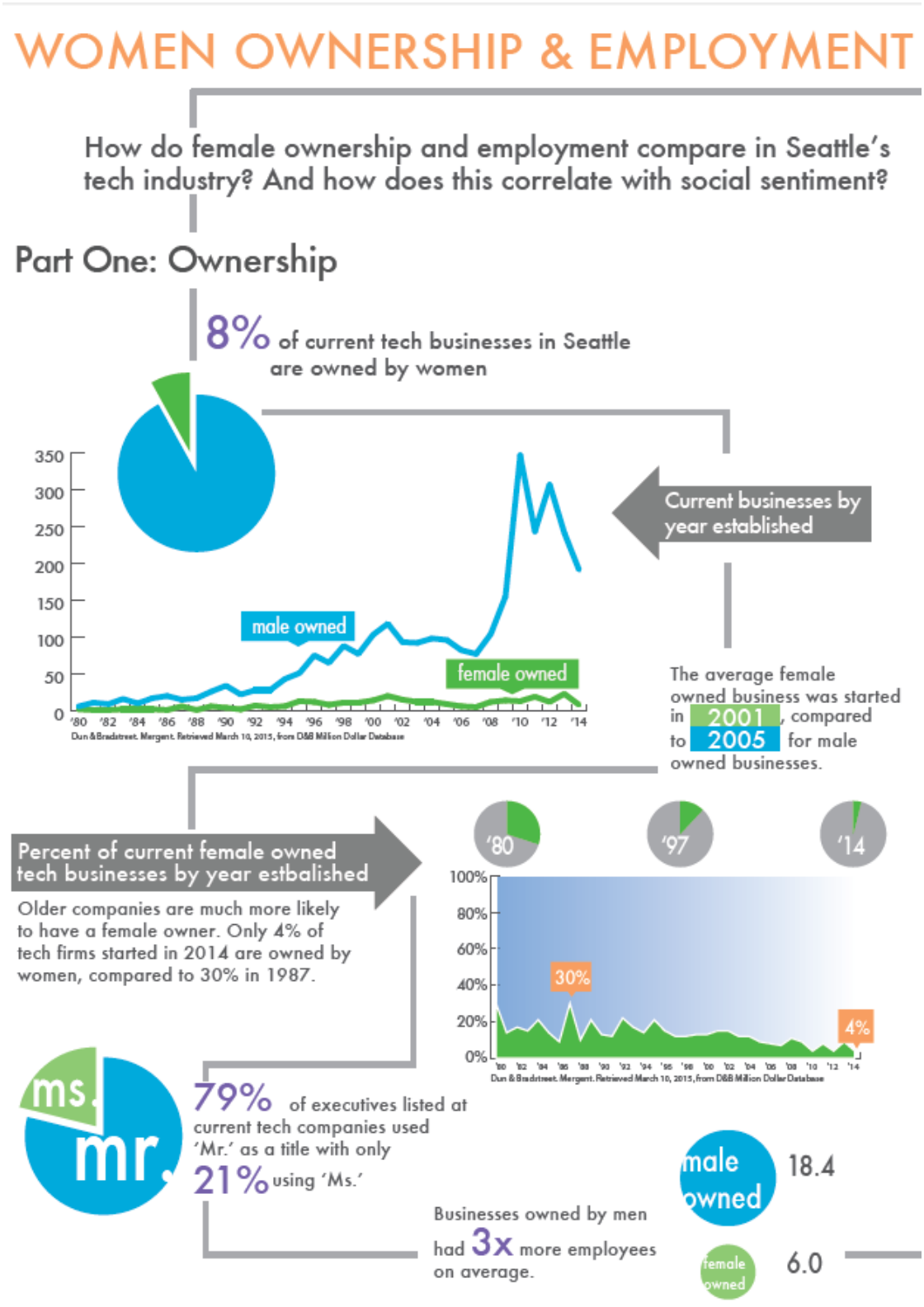
[112] Table Flip Manifesto. http://tableflip.club/

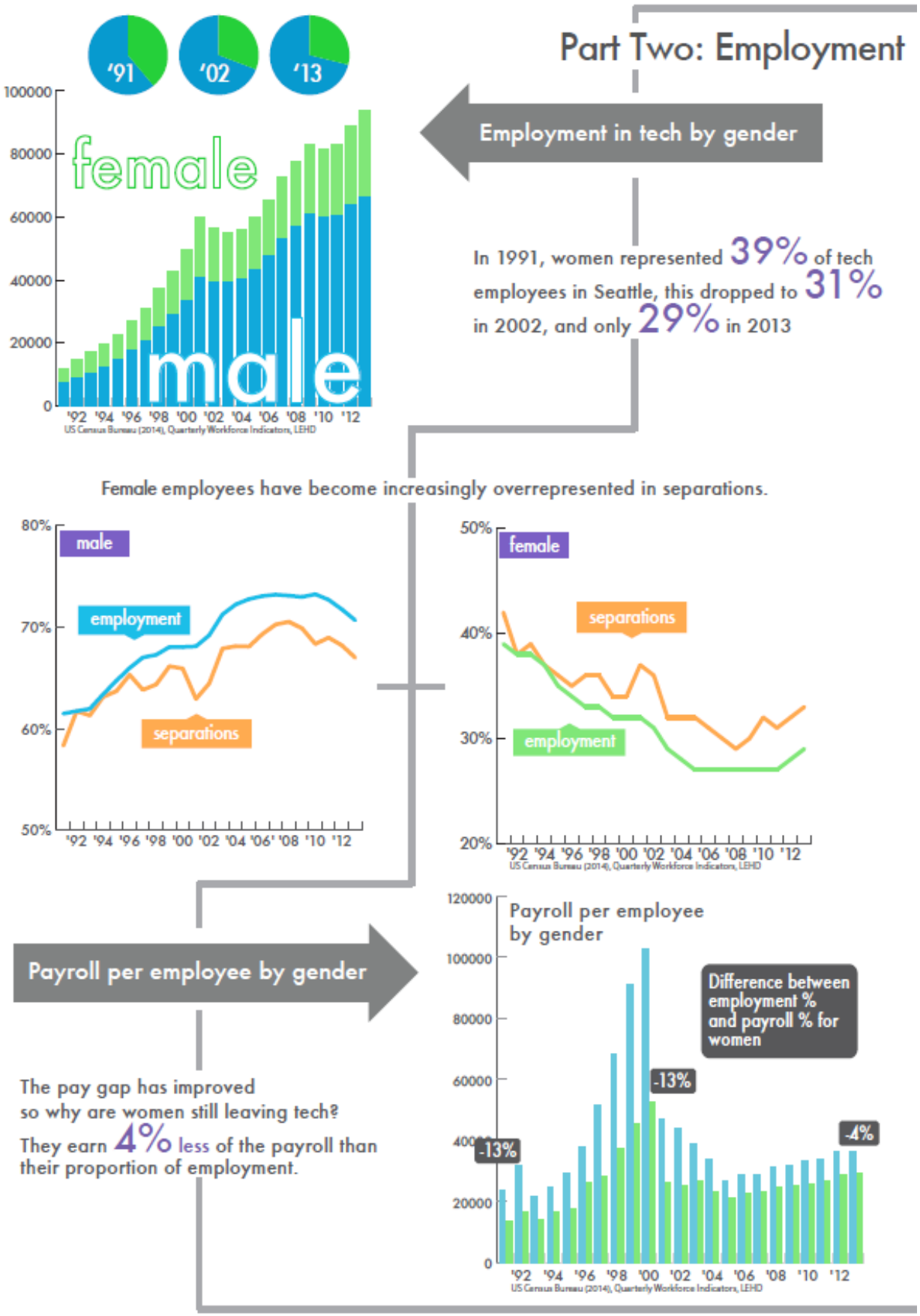
[113] Buckley, M. (2015). Seattle, San Francisco mayors join in boycott of Indiana over RFRA.

> midst of multiple lawsuits that highlight the gender inequality issues in Silicon Valley, this would be an ideal time to identify themselves as the leader in a new generation of high-tech. Seattle is home to influential tech giants and important startups. The city can bring leaders together from industry leaders to dicuss how they can move forward together in the region. This would not only allow Seattle to identify itself as supportive of women in tech and women in the region, but it would also be an opportunity for the often criticized tech companies to move forward.

This is a critical moment for the tech industry and for the City of Seattle. They need to welcome growth through the empowerment of women and commit to an environment where more people have economic opportunity. Many have focused on the role of private companies in solving gender equity issues. This is an integral component to effective change, but with the clustering of high-tech industries the local government has an important role as well. This is not only to the benefit of women, but to the industry, the region, and society as whole.

APPENDIX


WOMEN OWNERSHIP & EMPLOYMENT
How do female ownership and employment compare in Seattle's tech industry? And how does this correlate with social sentiment?
Part One: Ownership
8% of current tech businesses in Seattle are owned by women
Current businesses by year established
male owned
female owned
Dun & Bradstreet. Mergent. Retrieved March 10, 2015, from D&B Million Dollar Database
The average female owned business was started in 2001, compared to 2005 for male owned businesses.
Percent of current female owned tech businesses by year estbalished
Older companies are much more likely to have a female owner. Only 4% of tech firms started in 2014 are owned by women, compared to 30% in 1987.
'80
'97
'14
30%
4%
Dun & Bradstreet. Mergent. Retrieved March 10, 2015, from D&B Million Dollar Database
ms.
mr.
79% of executives listed at current tech companies used 'Mr.' as a title with only 21% using 'Ms.'
Businesses owned by men had 3x more employees on average.
male owned
18.4
female owned
6.0


Part Two: Employment
Employment in tech by gender
'91
'02
'13
female
male
100000
80000
60000
40000
20000
0
'92 '94 '96 '98 '00 '02 '04 '06 '08 '10 '12
US Census Bureau (2014), Quarterly Workforce Indicators, LEHD
In 1991, women represented 39% of tech employees in Seattle, this dropped to 31% in 2002, and only 29% in 2013
Female employees have become increasingly overrepresented in separations.
male
employment
separations
80%
70%
60%
50%
'92 '94 '96 '98 '00 '02 '04 '06' '08 '10 '12
female
separations
employment
50%
40%
30%
20%
'92 '94 '96 '98 '00 '02 '04 '06 '08 '10 '12
US Census Bureau (2014), Quarterly Workforce Indicators, LEHD
Payroll per employee by gender
Payroll per employee by gender
Difference between employment % and payroll % for women
120000
100000
80000
60000
40000
20000
0
-13%
-13%
-4%
'92 '94 '96 '98 '00 '02 '04 '06 '08 '10 '12
US Census Bureau (2014), Quarterly Workforce Indicators, LEHD
The pay gap has improved so why are women still leaving tech?
They earn 4% less of the payroll than their proportion of employment.

REFERENCES

Amazon Jobs. (2015, January 20). Retrieved March 12, 2015, from http://www.amazon.jobs/

Anita Borg Institute. (2013). Recommendations and Best Practices to Retain Women in Computing. *Women Technologists Count*.

Ashcroft, C., & Blithe, S. (2010). Women in IT: The facts. *National Center for Women and Information Technology*.

Ashcroft, C., & Breitzman, A. (2012, July 19). Who Invents IT? Women's Participation in Information Technology Patenting. Retrieved March 12, 2015.

Aufhauser, Herzog, Hinterleitner, Oedl-Wieser, & Reisinger. (2003). Principles for a 'Gender-sensitive Regional Development' *Instutut Fur Geographie Und Regionalforschung*.

Balk, G. (2014, September 8). Census: Seattle saw steepest rent hike among major U.S. cities. Retrieved March 12, 2015, from http://blogs.seattletimes.com/fyi-guy/2014/09/18/census-seattle-saw-steepest-rent-hike-among-major-u-s-cities/

Balk, G. (2014, September 23). Did Amazon's growth widen the gender pay gap in Seattle? Retrieved March 12, 2015, from http://blogs.seattletimes.com/fyi-guy/2014/09/23/did-amazons-growth-widen-the-gender-pay-gap-in-seattle-2/

Barnett, E. (2008, April 24). The Stranger. Retrieved March 12, 2015, from http://slog.thestranger.com/2008/04/no_you_cant_grab_my_tits

Ben, E. (2007). Defining Expertise in Software Development While Doing Gender. *Gender, Work & Organization*, 312-332.

Beninger, A. (2014). High Potentials in Tech-Intensive Industries: The Gender Divide in Business Roles. Retrieved March 12, 2015.

Bhatt, S. (2014, November 12). Amazon expands footprint with latest plan for more buildings. Retrieved March 12, 2015, from http://www.seattletimes.com/business/amazon-expands-footprint-with-latest-plan-for-more-buildings/

Bishop, T. (2014, May 12). Too many dudes: Amazon's growth is ruining Seattle's dating scene, says single guy. Retrieved March 12, 2015, from http://www.geekwire.com/2014/many-dudes-amazon-spoiling-seattles-dating-scene-says-entrepreneur/

Bishop, T. (2014, November 26). Company town: Amazon's rapid growth sparks housing boom in Seattle's urban core. Retrieved March 12, 2015, from http://www.geekwire.com/2014/company-town-amazons-rapid-growth-sparks-housing-boom-seattles-urban-core/

Bonanno, A., & Lopez, R. (2012). Wal-Mart's monopsony power in metro and non-metro labor markets. *Regional Science and Urban Economics*, 569-579.

Brodeur, N. (2014, October 14). Amazon's Company Town? Retrieved March 12, 2015, from http://www.politico.com/magazine/story/2014/10/seattle-amazons-company-town-111836.html#.VSrjAfl4r3Q

Buckley, M. (2015). Seattle, San Francisco mayors join in boycott of Indiana over RFRA.

Castilla, E., & Benard, S. (2010). The Paradox of Meritocracy in Organizations. *Administrative Science Quarterly*, 543-576.

Christian Landivar, L. (2013). Disparities in STEM Employment by Sex, Race, and Hispanic Origin. Retrieved March 12, 2015, from https://www.census.gov/prod/2013pubs/acs-24.pdf

Clark Blickenstaff*, J. (2006). Women And Science Careers: Leaky Pipeline Or Gender Filter? *Gender and Education*, 369-386.

Cook, J. (2014, October 23). Holy, crap: Amazon added 40,000 employees in the past year, nearing 150,000 staffers worldwide. Retrieved March 12, 2015, from

http://www.geekwire.com/2014/holy-crap-amazon-added-40000-employees-past-year-nearing-150000-staffers-worldwide/

Corbyn, Z. (2015, March 8). Silicon Valley is cool and powerful. But where are the women? Retrieved March 12, 2015, from http://www.theguardian.com/technology/2015/mar/08/sexism-silicon-valley-women

Destler, B. (2013, July 29). Advancing Women in Science and Technology is Critical for Innovation. Retrieved March 12, 2015, from http://www.huffingtonpost.com/bill-destler/advancing-women-in-scienc_b_3348909.html?utm_hp_ref=tw

Desvaux, G., Devillard, S., & Sancier-Sultan, S. (2010). *Women Matter, Women at the top of corporations: Making it happen*. McKinsey & Company.

Diversity at Amazon. (2014). Retrieved March 12, 2015, from http://www.amazon.com/b?node=10080092011

Duflo, E. (2012).Women Empowerment and Economic Development. Journal of Economic Literature.

Edidin, R. (2014, January 28). She Was Harassed By A Games Reporter. Now She's Speaking Out. Retrieved February 13, 2015.

Eikhof, D. (2012). A double-edged sword: Twenty-first century workplace trends and gender equality. *Gender in Management: An International Journal*, 7-22.

Faulkner, W. (2009). Doing gender in engineering workplace cultures. I. Observations from the field. *Engineering Studies*, 3-18.

Finley, K. (2014). In a First, Women Outnumber Men in Berkeley Computer Science Course | WIRED. Retrieved March 12, 2015, from http://www.wired.com/2014/02/berkeley-women/

Florida, R. (2014). Tech Culture and Rising Inequality: A Complex Relationship. Retrieved March 15, 2015.

Fouad, & Singh. (2012). Stemming the Tide: Why Women Leave Engineering. Retrieved March 12, 2015.

Fouad, N. (Director) (2014, August 7). Leaning in, but Getting Pushed Back (and Out). *American Psychological Association 2014 Annual Convention*. Lecture conducted from , Washington DC.

Freedman, M. (2008). Job hopping, earnings dynamics, and industrial agglomeration in the software publishing industry. *Journal of Urban Economics*, 590-600.

Girl power: Seattle ranks 3rd for women entrepreneurs - GeekWire. (2014, February 18). Retrieved February 18, 2015.

Gray, & James. (2007). Connecting gender and economic competitiveness: Lessons from Cambridge's high-tech regional economy. *Environment and Planning*.

Gray, & James. (2007). Connecting gender and economic competitiveness: Lessons from Cambridge's high-tech regional economy. *Environment and Planning*.

Gray, M., & James, A. (2007). Connecting gender and economic competitiveness: Lessons from Cambridge's high-tech regional economy. *Environment and Planning, 39*, 417-436.

Guynn, J. (2014, September 3). Jesse Jackson targets Amazon.com over diversity. Retrieved March 12, 2015, from http://www.usatoday.com/story/tech/2014/09/03/amazon-diversity-jesse-jackson-rainbow-push/15032879/

Halverson, M. (2013, January 23). Tarah Wheeler Van Vlack Fights for Women in Tech. Retrieved February 12, 2015, from http://www.seattlemet.com/news-and-profiles/people-and-profiles/articles/tarah-wheeler-van-vlack-fights-for-women-in-tech-february-2013

Han, L. (2011, September 21). Seattle Wonder Women Launch GeekGirlCon. Retrieved March 12, 2015, from http://www.seattlemet.com/arts-and-entertainment/articles/geek-girl-con-comics-october-2011

Hewlett, Servon, Sherbin, Shiller, Sosnovich, & Sumberg. (2008). The Athena Factor: Reversing the Brain Drain in Science, Engineering, and Technology. *HBR Research Report*.

Hewlett, S., Luce, & Servon. (2008). *The Athena factor: Reversing the brain drain in science, engineering, and technology*. Boston: Harvard Business School.

Hicks, M. (2005). What Do Quarterly Workforce Dynamics Tell Us About Wal-Mart? Evidence from New Stores in Pennsylvania. *IHS Global Insight*.

Huhman, H. (2012, June 20). STEM Fields And The Gender Gap: Where Are The Women? Retrieved March 12, 2015, from http://www.forbes.com/sites/work-in-progress/2012/06/20/stem-fields-and-the-gender-gap-where-are-the-women/

Inside Microsoft. (2014). Retrieved March 12, 2015, from http://www.microsoft.com/en-us/diversity/inside-microsoft/default.aspx#fbid=nCrl_lg5yR_

Kiley, B. (2014, June 4). Is Amazon the Reason Rents Are Going Up? Retrieved March 12, 2015, from http://www.thestranger.com/seattle/is-amazon-the-reason-rents-are-going-up/Content?oid=19751290

Kunda, G. (2009). *Engineering culture : Culture and control in a high-tech organization* (2nd ed.). Massachusetts Institute of Technology.

Kvasny, L., Trauth, E., & Morgan, A. (2009). Power relations in IT education and work: The intersectionality of gender, race, and class. *Journal of Information, Communication and Ethics in Society*, 96-118.

Lehman Brothers Centre for Women in Business. (2007). Innovative Potential: Men and Women in Teams. Retrieved April 12, 2015.

Leslie, D., & Catungal, J. (2012). Social Justice and the Creative City: Class, Gender and Racial Inequalities. *Geography Compass*, 111-122.

Level Playing Field Institute. (2011). The Tilted Playing Field: Hidden Bias in Information ... Retrieved March 12, 2015, from http://www.lpfi.org/tilted-playing-field-hidden-bias-information-technology-workplaces

Lien, T. (2015). Why are women leaving the tech industry in droves? Retrieved March 12, 2015, from http://www.latimes.com/business/la-fi-women-tech-20150222-story.html#page=1

Maltese, A., & Tai, R. (2011). Pipeline Persistence: Examining The Association Of Educational Experiences With Earned Degrees In STEM Among U.S. Students. *Science Education,* 877-907.

McDonald, S. (2014, October 15). ‘Gamergate': Feminist video game critic Anita Sarkeesian cancels Utah lecture after threat. Retrieved March 13, 2015.

McNeil, J. (2014, July 3). Stop Erasing Women From Tech History. Retrieved February 13, 2015.

National Science Foundation. (2012). Science and Engineering Indicators. Retrieved March 12, 2015, from http://www.nsf.gov/statistics/seind12/pdf/seind12.pdf

Negrey, C., & Rausch, S. (2009). Creativity gaps and gender gaps: Women, men and place in the United States. *Gender, Place & Culture,* 517-533.

Our Workforce Demographics. (2014). Retrieved March 12, 2015, from http://www.google.com/diversity/at-google.html

Page, S. (2007). *The Difference: How the Power of Diversity Helps Create Better Groups, Firms, Schools, and Societies*. Princeton University Review.

Pasulka, S. (2010, September 1). Too Few Women in Tech? Stop Telling People How They Should Feel About It. Retrieved March 12, 2015, from http://www.geekwire.com/2010/too-few-women-in-tech-stop-telling-people-how-they-should-feel-about-it/

Pian Chan, S. (2013, March 20). Sheryl Sandberg, “Lean In,” the gender gap in Seattle leadership.

Retrieved March 12, 2015, from http://www.seattletimes.com/opinion/sheryl-sandberg-ldquolean-inrdquo-the-gender-gap-in-seattle-leadership/

Pian Chan, S. (2013, March 20). Are tech companies indifferent to women in the workplace? Retrieved February 18, 2015.

Pian Chan, S. (2013, March 22). Are tech companies indifferent to women in the workplace? Retrieved March 12, 2015, from http://www.seattletimes.com/opinion/are-tech-companies-indifferent-to-women-in-the-workplace/

Pike, A., & Pose, A. (2006). *Local and regional development*. London: Routledge.

Porter, M. (2000). Location, Competition, And Economic Development: Local Clusters In A Global Economy. *Economic Development Quarterly*, 15-34.

PwC. (2012). Results from PwC Saratoga's 2012/2013 US Human Capital Effectiveness Report. Retrieved March 12, 2015.

Quarterly Results. (n.d.). Retrieved March 12, 2015, from http://phx.corporate-ir.net/phoenix.zhtml?c=97664&p=irol-reportsother

Rae, J. (2014, October 20). GamerGate's Economy Of Harassment And Violence. Retrieved March 13, 2015.

Raja, T. (2012, April 26). "Gangbang Interviews" and "Bikini Shots": Silicon Valley's Brogrammer Problem. Retrieved March 12, 2015, from http://www.motherjones.com/media/2012/04/silicon-valley-brogrammer-culture-sexist-sxsw

Reifman, J. (2014, November 19). 'Amageddon': How Amazon's culture is taking a toll on Seattle's future. Retrieved March 12, 2015, from http://www.geekwire.com/2014/commentary-amageddon-seattles-increasingly-obvious-future/

Reifman, J. (2014, May 12). You've got Male: Amazon's Growth Impacting Seattle Dating Scene.

Retrieved March 12, 2015, from http://jeffreifman.com/2014/05/12/youve-got-male-amazons-growth-impacting-seattle-dating-scene/

Reifman, J. (2014, June 10). Amazon's Impact on Seattle Dating. Retrieved March 12, 2015, from http://jeffreifman.com/2014/06/10/amazons-impact-on-seattle-dating-resonated-widely/

Reuben, E., Sapinenza, P., & Zingales, L. (2014). How stereotypes impair women's careers in science. *Proceedings of National Academy of Sciences, 111*(12).

Robb, Coleman, & Strangler. (2014). Sources of Economic Hope: Women's Entrepreneurship. *Kauffman Foundation*.

Robinson, K. (2014, August 1). Broverwhelmed: Gender Disparity in Seattle. Retrieved March 12, 2015, from http://www.seattlemet.com/news-and-profiles/articles/broverwhelmed-gender-disparity-in-seattle-august-2014

Rogoff, E. (2012). Entrepreneurship Databases: Illuminating Processes, Describing Phenomena and Steering Research. *Entrepreneurship Research Journal*.

Romano, T. (2014, May 23). Amazon Is Killing My Sex Life. Retrieved March 12, 2015, from http://www.damemagazine.com/2014/05/23/amazon-killing-my-sex-life

Sampson, T. (2013, August 1). BioWare writer targeted with harassment, death threats leaves job. Retrieved March 13, 2015.

Sears, K. (2014, May 27). City Council Unanimously Adopts Plan to Fix Seattle's Gender Pay Gap. Retrieved April 18, 2015.

Soper, T. (2013, April 9). Seattle ranks 2nd for women entrepreneurs but has the worst gender wage gap in America - GeekWire. Retrieved March 12, 2015, from http://www.geekwire.com/2013/seattle-worst-gender-wage-gap-america/

Soper, T. (2013, April 9). Seattle ranks 2nd for women entrepreneurs but has the worst gender wage gap

in America. Retrieved February 12, 2015, from http://www.geekwire.com/2013/seattle-worst-gender-wage-gap-america/

Soper, T. (2013, May 1). Life in Code: Why this entrepreneur is telling the stories of women in tech. Retrieved January 12, 2015, from http://www.geekwire.com/2013/life-code/

Soper, T. (2013, May 1). Life in Code: Why this entrepreneur is telling the stories of women in tech. Retrieved March 12, 2015, from http://www.geekwire.com/2013/life-code/

Soper, T. (2015, February 2). Women-only, tuition-free coding school Ada Developers Academy spins out of Tech Alliance - GeekWire. Retrieved March 18, 2015.

Tu, J. (2014, October 10). Nadella's advice to women on raises comes back to bite him. Retrieved March 12, 2015, from http://www.seattletimes.com/business/nadellarsquos-advice-to-women-on-raises-comes-back-to-bite-him/

Wenk, A. (2015, January 27). Incubator for women entrepreneurs coming to downtown Atlanta's Flatiron building - Atlanta Business Chronicle. Retrieved April 18, 2015.

Wheeler Van Vlack, T. (2015, January 15). Commentary: To bring 'binders full of women' into tech, we must get on the same page. Retrieved March 12, 2015, from http://www.geekwire.com/2015/commentary-bring-binders-full-women-tech-must-get-page/

Wheeler, D. (2014, April 4). Opinion: Why are Cortana and Siri female? Retrieved April 13, 2015.

Williams, J. (2014, October 1). Hacking Tech's Diversity Problem. Retrieved March 13, 2015.

Woolley, A., Chabris, C., Pentland, A., Hashmi, N., & Malone, T. (2010). Evidence For A Collective Intelligence Factor In The Performance Of Human Groups. *Science*, 686-688.